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# **CONSUMPTION AND BUSINESS FLUCTUATIONS**

**A Case Study of the Shoe, Leather, Hide Sequence**



## SUMMARY

This book records the history of an exploration—the exploration of a process: transmission of fluctuation from the buying of a finished good, shoes, to the earliest stage of production of the basic material, cattle hides. The investigation was difficult and laborious and its story can hardly be simple. It may be useful, therefore, to preface the detailed account by a brief statement of major findings.

After an allowance for a downward trend in shoe sales, retail sales of shoes and total consumer income followed a strikingly similar course, month by month, between 1929 and 1941. The systematic influence of other factors such as relative prices, past income, income distribution, or expectations concerning income or prices was difficult to identify except perhaps on a few particular occasions. Certainly it is interesting to discover the sales of this one commodity, of the many that people buy, so intimately dependent on the size of disposable incomes. However, the observation applies to a period when variations in income were extreme. When this is not the case, the influence of other factors may be more evident.

The major fluctuations in retail sales of shoes were shared by shoe production and the production of the material that comprises about two-thirds of the substance of shoes—cattle-hide leather. What is more, fluctuations appeared in retail sales and in the production of shoes and leather at about the same time, in spite of the fact that the physical conversion of hides into shoes takes many months. On the basis of the information at our disposal, retail shoe sales measured in numbers of pairs fail to show a systematic tendency to lag behind the production of shoes or of leather. Only when sales are recorded in dollars, does the notorious tendency for retail prices to resist change cause a lag to appear in the dollar volume of retail shoe sales compared with that of production of shoes or leather.

Retail sales of shoes and production of shoes and leather not only moved up and down with business cycles as commonly delineated but also exhibited a number of shorter waves. These waves appeared at about the same time in many aspects of the industry—prices, stocks, shipments—and at all of the vertical stages. From 1923 through 1940, there were thirteen and a half such fluctuations for which a chronology was developed for the shoe, leather, hide industry as a whole. I have called this sequence of waves *subcycles*; they averaged somewhat under a year and a half in

duration. Their peaks or troughs were sometimes virtually those generally recognized in business as a whole. But there were additional minor peaks or troughs; to illustrate, those bounding the brief expansion that in late 1930 and early 1931 interrupted the long depression, or the brief contraction toward the end of 1933 that occurred after the first months of the National Recovery Administration had passed.

Comparison of the time at which retail sales, shoe production, and leather production reached all subcyclical turns fortified the conclusion of the broadly synchronous timing at major turns. Thus the presence of these additional turning points helped to define how the various activities behaved.

But the minor waves are of considerable interest in themselves. Although the matter has not been studied systematically, there is at least preliminary evidence that many of the subcycles found in the shoe, leather, hide industry were shared by industry at large. Indeed, those appearing in retail sales of shoes were present, though in less pronounced form, in income payments to consumers. At the other end of the sequence, we find the price of hides and several other sensitive prices—scrap steel, common stocks, crude rubber, slab zinc—moving together in corresponding subcycles.

But though the several stages of the industry undergo generally parallel movements, they do not fluctuate by the same amount. Shoe production and leather production fluctuate considerably more than retail sales; hides entering the markets of this country (domestic production plus imports) fluctuate less. The behavior of inventory investment (monthly increases or decreases in stocks typically expressed in physical units)<sup>1</sup> is, of course, a function of these quantitative relations between successive processing stages. Thus inventory investment in shoes held by distributors or manufacturers increases or decreases when shoe or leather output does, whereas inventory investment in hides moves in the direction opposite to that of output. Inventory investment in leather is subject to only mild change.

But the behavior of stocks of all shoes or hides or leather sums two diverse patterns. Stocks of a given commodity awaiting sale, and thus “finished,” seem to

<sup>1</sup> “Investment in stocks” is used interchangeably with “monthly first differences in stocks”—the change in stock from one month to the next. It applies to the changes in the physical stock, not to the money tied up in stock, unless otherwise specifically indicated.

move inversely to investment in "raw" or in-process stocks, which, in turn, parallel subcycles in output. This is especially interesting in the case of leather, where, though total stocks change relatively little, investment in leather stocks by shoe manufacturers on the one hand and such investment by tanners on the other fluctuate sharply; the former displays positive and the latter negative conformity to shoe or leather production.

For many purposes, therefore, it is important to study inventory investment in terms of the experience of individual businesses. So conceived, inventory investment plays an important part in the subcyclical fluctuation of receipts of shoes and of leather. As far as I can judge, close to one-half of the total subcyclical fluctuation of receipts of shoes by retailers seems to be accounted for by fluctuation in their inventory investment in shoes; the rest is the direct result of fluctuation in consumer buying. A similar statement applies to subcyclical fluctuation in the receipts of leather by shoe manufacturers—about half goes into changes in their stocks and half into alterations in the output of shoes.

If, however, we consider only the major swings in receipts—those associated with business cycles—we find that inventory investment contributed considerably less to the per month amplitude during cyclical fluctuations in the earlier stages relative to the finished stage than it does to subcyclical fluctuation. In this as in several other respects our findings accord with and extend those of Moses Abramovitz.<sup>2</sup> He showed that inventory investment tended to play a more important part in short business cycles than in long ones. Apparently this is true of still shorter fluctuations, subcycles: the per month amplitude of fluctuation in inventory investment is greater for subcycles than for cycles. What is more, if we differentiate longer from shorter subcycles, the principle still holds.

The two outstanding facts from which the interesting pattern of inventory investment derives—the largely synchronous turning dates for the vertical stages in the industry, and the greater severity of fluctuation, especially for the minor movements, toward the center of the vertical sequence—focus the problem to which an answer should be found.

At a superficial level, the key to the three-part answer lies in the behavior of *orders*. (1) Turns in orders placed by shoe retailers with their suppliers tend to anticipate turns in sales by a few months—a period long enough for shoes to be produced. If shoe manufacturers order upper leather immediately upon receiving orders for shoes, the leather too can be com-

pleted at about the same time as the shoes are produced or sold to consumers. (2) But orders by retailers have a far stronger fluctuation than have retail sales. Though producers of shoes and leather manage to make their production much smoother than their daily or monthly new orders, output nevertheless varies a great deal more than consumer buying of shoes. (3) The response of the hide supply to fluctuation in shoe and leather production is muted; cattle are not slaughtered in accordance with the demand for their skins, though the number brought to central markets of this country responds to the strength of demand. At this point in the sequence, it is the *price* of hides rather than their supply that displays the agile reaction to changes in demand.

Explanation at the superficial level calls for explanation at a deeper level, and most of the work that went into this book has been directed at this target. The three superficial explanations involve a subject dealt with in the literature under the general heading of acceleration—the timing and amplitude aspects of the problem. But they also involve (the third one particularly) the way in which prices operate and their relationship to the physical flow of goods.

It is obvious, of course, that it is impossible to study process without understanding how businessmen frame their problems and develop their solutions. Consequently, these matters were discussed at some length with many people in the trade. But the discussions were not intended to provide the basis for generalization about practices in the industry; they were used, rather, to frame the questions that were put to the monthly time series at our command. Of these there were a great many—data on sales, shipments, prices, inventories, output, and orders; indeed this unusually full record was one of the major reasons for selecting the shoe, leather, hide industry for study. But in spite of this relatively rich supply, the information was by no means adequate to develop sure answers to the questions that the interviews and a preliminary study of the time series indicated should be asked. But rather than cut the questions to the size that the data could handle with assurance, I have chosen to accord the questions their full stature and simply answer them as best I can. It will be convenient first to discuss the factors influencing the amplitude at sequential stages before turning to the interesting and delicate matter of timing.

Shoe retailers order the shoes they expect to sell. In addition, when sales are high, somewhat larger stocks

<sup>2</sup> Moses Abramovitz, *Inventories and Business Cycles*, National Bureau of Economic Research, 1950.

are required to service customers, though the needed increase is considerably less than proportional to the increase in sales; this requires buying for the purpose of adding to stocks. But when sales are increasing, retailers tend to increase their buying relative to their selling for several other reasons also. They expect (or actually experience) some delay in receiving the shoes that they have bought and larger stocks are required to bridge the longer delivery periods, other things the same. Also, when factories are moderately busy, the choice seasonal merchandise can no longer be obtained at the last minute, so that a larger than usual proportion of orders for these goods are placed well in advance, at the time that new lines are first shown to the trade. Finally, prices are likely to rise and consequently early ordering is indicated. The net result is that both stock on hand and stock on order increase as business improves, and this implies that buying exceeds selling while sales are rising and markets tightening. As sales decline and markets ease, these same factors make for a decline in stock on hand and on order and consequently retailers buy less than they currently sell. Thus during good times shoe production and orders rise more than sales and in poor times fall more.

Shoe manufacturers pass on in their orders for leather the greater fluctuation (relative to retail sales) that characterizes their sales (orders received from retailers and wholesalers). Indeed, they probably add somewhat to its amplitude. The same reasons apply at this stage as at the previous one, though their relative importance differs. Since the shoe manufacturer has a substantial portion of orders on his books in time to buy the leather that is required for their manufacture, he does not actually need to increase service stocks in the same way as the retailer does. Seasonal bottlenecks are not quite so important, partly because the article he buys is less differentiated, and partly because seasonal fluctuation in the operations of his suppliers (tanners) is not so strong. Short-term variations in leather prices, on the other hand, are far more extreme than in shoe prices, so if prices are expected to rise it is best to cover (if not to have anticipated) leather requirements at the time orders for shoes are written. Finally, because of the staple character of several important sorts of leather, there is less to lose from an inaccurate forecast of sales than in the case of shoe buying by distributors. Here again statements may be reversed to apply to reduced buying and pessimistic expectations.

Tanners are in a rather different position from the other two sets of businessmen for a number of reasons. They sell a product for which it is feasible to carry large inventories of finished or nearly finished goods.

It is expensive to vary the rate at which factories operate. Choice hides have to be bought as they become available. Heavier than usual purchasing of hides tends to raise their highly sensitive price and lower that of leather, which, though not as volatile as the price of hides, is nevertheless subject to keen trading. Only when hide prices seem distinctly low, and the domestic supply is potentially short, do tanners seem to buy more hides than they ordinarily would. Even then leather-goods manufacturers may extend their advance position in leather as much as or even more than tanners do in hides. Thus tanners' purchasing of hides is more likely to damp than to augment at least many of the short-term fluctuations in their sales of leather.

In general, the investigation pictures augmented amplitude of fluctuation resulting not only from the fact that more goods are needed in the pipe lines when the rate of flow is high than when it is low, but also from the character of expectations or of current conditions bearing on proper short-term timing of buying. This second set of factors particularly tends to be subject to short swings—considerably shorter than the "forty-month" business cycle. Whether amplitude is increased or muted by these two types of factors and which of the several elements are more important in the total effect depend on the specific and quite detailed character of the business problems at each stage. One of the things I have tried hardest to learn is just what elements in the physical and pecuniary problems of a business are critical to the formation of the pattern.

A counterpart to the changing amplitude of fluctuation in the flow of goods at each of the stages is a changing amplitude of fluctuation in prices. The causal relationships run in both directions. The influence of prices on buying is seen in several ways. Optimistic expectations about prices are one of the motives for extending the advance position, and expectations must be, in part, a function of the recent history of actual prices. In addition to this very short-term conforming association between buying and prices, there is doubtless also the somewhat longer-term inverse association of the quantity demanded and price. This seems to appear as a factor determining shoe sales to consumers: more shoes are bought when prices are low than when they are high, other things the same.

Evidence of causal impact in the reverse direction, that is, of the influence of buying on price, is ubiquitous. Increases or decreases in consumer demand and the superimposed increases or decreases in stocks cause prices of leather and hides to rise or fall and shoe prices to do likewise, though tardily. The impact on hide prices is, of course, strongest of all. When

shoe and leather sales are relatively high, more hides are required than are yielded by the current domestic kill of cattle; stocks of dealers are drawn down and prices rise. The additional requirements are brought to central markets from back country and abroad at higher costs per unit of a given quality. The reverse is true as demand falls.

This two-way relationship, but especially the influence of demand on prices, is reflected in a regression analysis in which the monthly course of the highly fluctuating price of cattle hides is reproduced with surprising faithfulness. Prices are found to have a positive association with shipments of cattle-hide leather to leather-goods manufacturers, and with the ratio of stocks of hides and of leather awaiting processing to those awaiting sale. Hide prices probably also tend to be higher, other things the same, when finished-shoe prices are higher and vice versa. The association between the several factors can be explained in terms of an upward-sloping supply schedule for hides (also subject to some short-term shifts) that is intersected by elaborately shifting demand schedules as demand for the final product and for the intermediate ones changes.

The net result of this complex causal sequence is that fluctuations in hide prices parallel those in the flow of goods—both the major and minor fluctuations. But the same remark does not apply to shoe prices, as far as can be told from available statistics. Shoe prices, either at retail or at wholesale, resist change and succumb mainly to the strong and prolonged influences of cyclical change and then with a considerable lag. Leather prices are, in this respect, intermediate between shoe and hide prices. Thus, like the flow of goods, price increases its amplitude of fluctuation as it recedes from the final consumer, though unlike the pattern for the physical flow, amplification continues right through to the raw-material market. Price differs also in the lag found at the finished stage. As was true for physical flows, amplification is stronger for minor than for major swings; indeed most of the minor movements are entirely absent from statistics on retail or wholesale shoe prices.

Closely interwoven with many of the factors contributing to the difference in amplitude of fluctuation at the several stages are tendencies that bring the cumulative process of rise or fall to an end. Concerning these tendencies, my chief finding is simply that there are a considerable number of them, and they all are deeply imbedded in a complex of business objec-

tives and methods. Some apply at one stage of the industry and some at another.

The first mechanism that was encountered plays an important part in retail shoe stores but not at other stages. It apparently operates through a stoutly implemented objective of holding stocks to a planned absolute size. (It is this objective, rather than that of achieving a stipulated sales-stock ratio, which seems to be typically enforced in the short run.) It is capable of setting turns in orders ahead of those in sales under conditions that seem common in retail shoe stores. In addition to (1) the firm and clear stock objective, these conditions are: (2) the need to order a substantial amount of merchandise well ahead of time on the basis of a guess about future sales; (3) a tendency for the guess to project current sales on the basis of sales of the recent past or the corresponding month of the previous year or both, so that the error of the guess has the pattern of changes in sales; (4) a tendency for the correction that is required to bring actual stocks in line with planned stocks to involve correction primarily of the volume of orders rather than of selling prices; and (5) a tendency for fluctuation in sales to retard before it reverses. Neither for cycles nor for subcycles does this last tendency have the form of regular sine-like shapes with retardation occurring at some particular segment of the phase or after a stipulated number of months. But since the highest rate of increase occurs sometime during subcyclical expansion, and of decrease sometime during contraction, this pattern, when embodied in a model that reflects how errors may be observed and corrected, reveals a tendency for corrective orders to reach peaks and troughs before sales. These orders, since they represent a more than proportional part of the business of wholesalers or in-stock departments of shoe manufacturers, whose sales are often watched by others in the trade, tend to exert more than proportional influence in warning the industry of an impending change in prospects. When added to the rest of retailers' orders, those aiming to anticipate future sales, corrective orders also impart some tendency for orders as a whole to lead sales. The strength of this tendency increases if stocks are intended not merely to hold to a fixed size but also to increase when sales do in accordance with perhaps a fixed incremental, if not an average, sales-stock ratio.

The model I have described shares its basic characteristics with one used by Lloyd Metzler to analyze inventory cycles in the economy at large. It differs, however, with respect to specific characteristics listed in the previous paragraph which, among other things, cause it to be applicable to only a very limited area of the industry. It differs also from the acceleration

model described by John Maurice Clark with respect to those factors that are likely to set turns ahead, though not necessarily with respect to those capable of increasing the amplitude of fluctuation in "derived demand." The relationship among these and other models is examined in Chapter 10.

A second group of factors capable of bringing on turns in buying involve reversals in expectations about market conditions. These expectations affect judgments concerning when to buy; they cause an alternating increase and decrease of the number of weeks' supply that is held on hand and on order. The central phenomenon is simply that expectations about the direction of change in prices, about delivery conditions, and about the adequacy of selections often cause ordering by retailers and shoe manufacturers to cease to rise or fall before consumer buying itself does. The many processes that tend to cause a shift in buying associated with a change in market prospects can hardly be outlined here. However, it will be useful to illustrate them by discussing a few of the more important ones. They are stated in terms of expansions—that is, of factors tending to advance the date of peaks; they can, for the most part, be reversed to apply to contractions.

Consider first why the several factors that motivate extension of the number of weeks' supply on hand and on order do not maintain their force indefinitely. One of the reasons for increasing the proportion of the total season's orders placed in the "preseason" months, and thus extending the market position, is an expected increase in purchase price; yet the appropriate extension is a function of the anticipated rate of change in prices and this can hardly be expected to continue to rise indefinitely. The assurance with which a given expectation is held is another factor. Expectation of (or actual) delay in deliveries or impoverishment of selections, which likewise has an assurance dimension, is an additional reason for market extension; but the number of months between seasonal peaks for suppliers provides a limit to the amount of delay that their customers are likely to expect. In short, most of the judgments upon which optimistic evaluations of market prospects depend can hardly continue to improve indefinitely.

But whatever the opinions of would-be buyers, the actual buying that they will undertake has limits of its own; for there appears to be in this industry what one might call a "long-short market range"—a maximum and minimum of weeks' supply on hand and on order that people in each branch of the industry recognize as proper. The limits differ for various sorts of goods. Also, the limits are not sharp; the amount of extension deemed proper at any given time is a func-

tion of market prospects at the time. However, the existence of this long-short range means that as extension or contraction of the market position continues, under a given set of conditions, and a given set of expectations held with a given degree of assurance, risk is judged to increase in accordance with a U-shaped curve. Action meets with increasing resistance as either end of the range is approached. As the market position of retailers or wholesalers in shoes and of shoe manufacturers in leather approaches the maximum justified by the current scene, the stimulating effect on suppliers ceases.

But there seem to be other influences that tend to cause an actual reversal of the impact by reversing the character of expectations about market conditions. A slowing down in the rate of inventory accumulation and a reduction in the backlog of unfilled orders may themselves reverse expectations about increases in market tensions and consequently about prices too. Margins over leather costs per pair of shoes have an inverse subcyclical pattern yet do not seem to transcend definable limits; the patterns are consistent with the interpretation that the approach to these limits may tend, other things the same, to reverse expectations about the direction in which prices are likely to change.

A reversal anywhere is converted to a reversal everywhere by the vigilance with which firms watch the stocks, the buying, and the selling of their competitors, their customers, and their suppliers. It is transmitted also through the need of tanners to keep the spread between current hide and leather prices adequate to profitable operation; changes in buying predicated on changes in the spread serve to erase the latter, transmitting strength or weakness in leather markets to strength or weakness in hide markets and vice versa.

In summary, market-prospect-tied buying has the capacity to reverse its direction of change for three sorts of reasons: there are natural limits to changes in market extension or contraction; there are factors tending to bring on actual reversal; and there are factors that transform a change anywhere into a change everywhere. It is significant that these varied factors, like so many of the other matters that have presented themselves for study, operate in shorter rhythms than the forty-month cycle. It is interesting, too, that they convert changes in prices and in other market conditions into changes in physical flows of goods, and changes in physical flows into changes in prices. This active interplay between pecuniary and other economic factors, which appears in so many forms in this study, accords with a basic conception underlying Wesley Mitchell's work in business cycles.

The turns in buying associated with market pros-



pects cannot come materially later than those in retail sales of shoes, or probably than turns in buying associated with the enforcement of stock objectives, since such changes would inevitably cause reversals in market prospects. They might, however, come earlier. Certainly there must have been times when they did but a persistent upward (or downward) surge in consumer spending carried the industry through a readjustment phase in market-prospect-tied buying. The figures seem to bear testimony that such episodes did exist. More typically, however, the system of intercommunication in the market, the importance of consumer buying and of retailers' stocks in shaping opinions about market prospects, and the fact that hide prices are more critically influenced by change in demand than by independent change in supply, keep the two sets of mechanisms in approximate synchronization, separated only by short leads or lags. In any event, such tests as I am able to make suggest that both sorts of factors—those connected with changes in demand and with maintaining adequate service stocks, and those connected with changes in market prospects—seem to have had some bearing on the timing as well as the amplitude of subcycles in the inventory investment of shoe retailers and manufacturers.

Farther than this we cannot go on the basis of the studies described in this book. To gather the threads together: in the shoe, leather, hide sequence, fluctuation in the amount or even the rate at which consumers buy shoes is reflected in an exaggerated form in earlier marketing and processing stages. Amplification is far more extreme for short swings in business than for longer ones, thus generating in the earlier operations a clear short cycle averaging less than a year and a half in length—the subcycle. In this industry, there is no lag in the transmission of either cyclical or sub-

cyclical fluctuation for two reasons. On the one hand, the agent of transmission is the order rather than actual output or sales; orders, beginning with those placed by retailers, have a tendency to reach peaks and troughs ahead of sales. Obviously, this is the result not of clairvoyance, but of intrinsic reciprocating mechanisms: one set is associated with providing for proper service to the customer, one with correct timing of buying in view of changing market prospects, and one with prices and price relationships themselves. These mechanisms are not found throughout the sequence but only in certain stages where the product and especially the physical and pecuniary conditions under which it is purchased, processed, and marketed, have the stipulated characteristics.

The study has, of course, been confined to the shoe, leather, hide sequence for the years between the two world wars. Yet much of what has been learned could not help but apply, after proper transposition, to other times and to other industry sequences. It is quite literally true elsewhere or not true here. For it is the basic business objectives and the situations under which they must be pursued that generate the patterns of buying and selling characterizing each of the stages of this industry. These objectives and situations are not of a sort (except with respect to their particular combinations) that could possibly be peculiar to any one industry in a common economic environment. The question, therefore, is not whether the same elements are to be found elsewhere but whether they are the important elements, and in what combinations they are likely to be found under what conditions. In the final chapter, especially toward its close, I have indulged in brief speculation on these matters, their theoretical implications, and some of the major conundrums that they pose.